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Systemic Lupus Erythematosus

Earlier detailed surveys of the disease systemic lupus erythematosus (SLE) have covered the natural history, clinical symptoms, diagnosis, and many aspects of treatment of the disease. The current report deals only with certain developments in the study of the disease which have occurred recently and have not been so extensively discussed.

Abnormal Immunologic Reactions. Abnormal immunologic reactions have been found more frequently and in greater number in SLE than in any other disease. In addition to their number, these reactions are notable in two respects. First, the abnormal antibodies which have been identified are capable of reacting with the patient's own tissues and, therefore, the reactions appear to be autoimmune. Second, among these antibodies is a group which reacts with the constituents of the cell nucleus—including nucleic acids—and probably represent the first clear example of antibodies to nuclear substances.

One of the most fascinating aspects of SLE is the LE cell. This cell results from the alteration of the nucleus of a leukocyte by a factor in the serum of the patient. The affected nucleus becomes swollen, is extruded from the cell and is then engulfed by another leukocyte. This second leukocyte, containing within its cytoplasm the altered extruded nucleus, is the LE cell. In recent years, investigations employing immunologic and histochemical techniques have led to an understanding of the mechanism of this phenomenon and, concomitantly, to demonstration of the existence of antinuclear antibodies.

The LE cell factor is not the only factor present in SLE serum which reacts with constituents of the nucleus. Other factors produce reactions which can be demonstrated by standard immunologic procedures. It has been possible to separate many of the antinuclear factors from one another and to demonstrate that there is at least one separate factor which reacts with each of the nuclear constituents. An individual SLE serum may contain all, some, or none of the antinuclear factors.

The serum titers of the antinuclear factors are highest during disease activity and diminish or disappear during spontaneous or therapeutic remissions. Because of specific characteristics, the LE cell factor appears to be one member of a group of antinuclear antibodies. Recent histochemical investigations confirm the conclusion that formation of LE cells is the result of an immunologic reaction. In addition to the antinuclear antibodies, at least one, and perhaps more, serum factors occur which fix the complement with constituents of cell cytoplasm.

Although the antinuclear and anticytoplasmic factors appear characteristically in SLE, they also occur in various diseases—other collagen diseases, several types of cirrhosis, macroglobulinemia, and occasional cases of leukemia.

Antibodies to red blood cells occurring in SLE have been demonstrated by the Coombs method, adding to the list of unusual antibodies known to occur in this condition. Antibodies to white blood cells and platelets have been demonstrated by agglutination techniques. The false positive Wassermann reaction is evidence for existence of the Wassermann reagin or antibody. In addition, a circulating gamma-globulin has been demonstrated to prolong the clotting time, probably by interfering with thromboplastin, and the characteristic renal lesion has been shown to be the site of extensive deposition of gamma-globulin.

Certain of the unusual antibodies can be detected readily in a clinical laboratory and have proved to be of diagnostic value. A positive Coombs test, a positive Wassermann reaction, a prolonged clotting time, and a positive LE cell preparation comprise a tetrad which is diagnostic of SLE. The presence of any one of these abnormalities suggests the diagnosis.

The mechanism which gives rise to the unusual antibodies is unknown. The large number of antibodies which appear suggests that there is an abnormally reactive system for antibody synthesis which produces antibodies to normal cell constituents. The pathogenic significance of the various unusual antibodies is also not clearly understood. It is possible that they are byproducts of an altered immunologic response rather than decisive pathogenic agents.

When injected intradermally with homogenates of their own leukocytes, many patients with SLE have developed erythema and induration at the injection site with an inflammatory infiltration.

Whatever the pathogenic significance of the unusual antibodies or the peculiar skin reaction may prove to be, the demonstration of their existence by a variety of standard immunologic methods indicates the presence of a grossly abnormal immune system.

Incidence of the Disease. Ten years ago, SLE was considered a rare and usually fatal disease. It was recognized almost exclusively in its late stages. Since recognition of the LE cell phenomenon, the diagnosis has been made more frequently. However, the border lines distinguishing this disease from others have become less distinct. As a consequence, no unequivocal information is available dealing with the incidence of SLE in the general population; but evidence for a familial occurrence is emerging. Data indicate in certain families a predilection for an abnormal immunologic response which may express itself as rheumatoid arthritis or as SLE, or may simply manifest itself as a serologic abnormality without evidence of clinical disease.

Renal Disease. Renal disease provides the most difficult clinical problem in SLE today. This appears to be due to a change in the natural history of the disease under the influence of steroid therapy. Most systemic manifestations of SLE respond to steroids, at least temporarily. Acute fulminating fatal crises of SLE have almost ceased to occur. Subacute bacterial endocarditis is rare when compared to its incidence 20 years ago. As a

consequence (because the renal lesion does not respond to steroids as readily as do systemic lesions), the average length of life of the patient is increasing and renal disease has come to the fore as the major problem in management and as the prime cause of death.

In renal disease of SLE, the typical pathology is the "wire loop" lesion which is focal in nature, but may extend throughout the kidneys. Although its origin remains obscure, immune mechanisms may be involved.

When response of renal disease to steroids occurs, the mechanism of improvement is unknown. Not all cases can be expected to respond to therapy. However, experience to date certainly does not permit the view that the kidney lesion cannot be reversed with treatment. The successes thus far obtained argue strongly in favor of treating all patients early and thoroughly in the hope of avoiding development of severe renal disease, and thus greatly prolonging the life span of the patient.

General Therapy. In relation to therapy of the disease, no new developments of significance have occurred. However, more experience has been gained in use of antimalarial drugs. As in the case of renal disease, some refinements of current methods appear possible.

Antimalarial drugs are highly effective in discoid lupus erythematosus; variable results have been reported in SLE with and without steroids. Atabrine, 100 to 300 mg. per day—or the equivalent in other drugs, such as Chloroquin and Plaquenil—has been used. The mechanism of action is entirely unknown.

One of the most important problems in therapy is the evaluation of the length of time corticosteroids should be continued and the dose which should be employed. Three distinct phases of patient response to therapy can be identified in most cases: (1) improvement of clinical symptoms; (2) improvement in blood abnormalities, especially in the sedimentation rate, gamma-globulin, albumin, and hemoglobin; (3) improvement of hematuria, azotemia, proteinuria, and the compromised urea clearance. When prednisone approximating 50 mg. per day in an adult is used, arthritis, fever, pleuritic pain, and rash usually improve or disappear dramatically within a few days. The blood picture does not improve as quickly and return to normal is delayed until after treatment for 2 weeks to one month or longer. If renal disease is present, the hematuria is likely to persist for a minimum of 2 months. When treatment with steroids is continued until the blood and kidneys are normal or the abnormalities have become stabilized, there is likely to be a much lower incidence of exacerbations and advancing renal disease. In addition, there will be a greater number of remissions which will permit withdrawal of steroids.

"Lupoid" Hepatitis. This term has recently been introduced—perhaps unwisely—to describe the liver disease which appears in a group of patients who also have certain symptoms compatible with SLE and who have positive LE cell preparations. The nature of the hepatic lesion remains obscure, particularly in its early stages and in relation to SLE. It appears to be established that: (1) an unexplained cirrhosis (or chronic hepatitis) occurs

in young people, especially women, and (2) positive LE cell preparations and symptoms suggestive of SLE are present in some of these patients. While it is conceivable that these cases of hepatic disease are an unusual form of SLE, it is also conceivable that some of the symptoms and serologic abnormalities are a consequence of an immunologic abnormality induced in some way by the mechanism responsible for the liver injury. In pursuit of this lead, it will be highly desirable to examine cases of SLE for evidence of liver disease, and to search for immunologic abnormalities in cases of hepatic disease. (H. Holman, Systemic Lupus Erythematosus: J. Pediat., 56: 109-119, January 1960)

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Cardiotoxic Effects of Quinidine

Quinidine has an established place in the management of certain cardiac arrhythmias, although the toxic effects produced by this drug remain a potential hazard. With the relatively recent advances in determining the plasma concentration of quinidine and the rather specific indications and cautions stressed when this drug is used in clinical practice, severe toxic reactions can be minimized, but probably never completely eliminated.

Toxic manifestations of quinidine can be grouped into four major categories, only the last of which will be considered in this study.

1. Allergy or idiosyncrasy which includes febrile reactions, skin eruptions, thrombocytopenia, and "quinidine shock."

2. Toxic reactions due to the inherent properties of the cinchona alkaloids which have been grouped under the term "cinchonism." These include impairment of hearing, tinnitus, blurred vision, giddiness, light-headedness, and tremor.

3. Gastrointestinal symptoms due to local irritation, such as nausea, vomiting, anorexia, colicky pain, and diarrhea.

4. Cardiotoxic effects.

The toxic effects produced by quinidine on the heart and its conduction system have long been recognized. This is the category in which most of the fatal accidents occur. Quinidine is a depressant of the cardiac muscular and conduction systems. Therefore, it is potentially capable of producing a wide variety of electrocardiographic changes. Widening of the QRS to more than 0.12 second, prolongation of the QT interval which may in part be due to QRS widening and/or prominent U-waves, depression of the ST-segment, low-voltage T-waves, and widening and notching of the P-waves may occur with therapeutic doses.

When profound changes in cardiac rhythm appear, severe hemodynamic alterations soon follow. Ventricular premature beats or an increase in QRS width of 50% or more rarely in themselves lead to a fatal outcome if the drug

is discontinued. However, such is not always true for complete A-V block, ventricular tachycardia, or ventricular fibrillation. Marked depression of the higher pacemakers is frequently followed by development of either an idioventricular rhythm progressing to asystole, or ventricular tachycardia and ventricular fibrillation. In these latter groups, acute circulatory collapse and death may ensue.

When quinidine is employed in management of cardiac arrhythmia, initial small doses, repeated electrocardiograms, quinidine plasma concentrations, and frequent and careful clinical appraisal of the patient must be instituted if the severe toxic manifestations are to be minimized.

Management of the patient after development of the severe cardiotoxic manifestation of this drug has left much to be desired. Many drugs have been studied for their effect to revive the heart depressed by quinidine. Of the drugs tested—including epinephrine, norepinephrine, caffeine, acetylcholine, ephedrine, and phenylephrine—epinephrine was found to be the most powerful and consistently effective drug. However, its use is contraindicated in the presence of frequent ventricular ectopic beats, ventricular tachycardia, or ventricular fibrillation. Therefore, epinephrine appears to have a limited and nonspecific place in the treatment of this disorder.

Experimental observations and case reports suggest that molar sodium lactate exerts an antagonistic effect on the cardiodepressant action of quinidine, possibly by producing alterations in certain electrolyte concentrations and perhaps blood pH.

Laboratory experiments indicate that the "sodium-carrying" system in effect during polarization of the myocardial fiber is depressed by quinidine; consequently, there is an alteration of the normal cellular ionic shifts which occur during cardiac muscle contraction. Other studies demonstrate that quinidine renders the cell membrane less permeable to potassium ions. Results of various studies combine to indicate that quinidine exerts part, if not all, of its pharmacologic action on the heart by producing alterations in the ionic equilibrium which takes place during the cardiac cycle. This inhibition of ionic transfer with the accompanying derangement of the normal sodium and potassium equilibrium is the probable mechanism by which quinidine depresses the cardiac conduction system.

The clinical sequelae of the described changes are the alterations in cardiac rhythm encountered clinically. The ability of molar sodium lactate to counteract these derangements probably results from introduction of a high concentration of sodium ions, and not by alleviation of the depressant effect of quinidine on glucose and fructose uptake by the myocardium, as has been suggested by some.

On the basis of experimental work and clinical studies thus far obtained, molar sodium lactate appears to offer a rational approach in the management of cardiotoxic effects of quinidine. (D. J. Bailey, Jr., *Cardiotoxic Effects of Quinidine and Their Treatment*: A. M. A. Arch. Int. Med., 105:13-22, January 1960)

ECG Patterns of Hypertrophy

The correlation of the electrocardiogram with anatomic evidence of ventricular hypertrophy—while laden with numerous pitfalls—still remains the best available means of determining the accuracy of the electrocardiographic diagnosis of ventricular hypertrophy.

In 100 instances of isolated left ventricular hypertrophy (LVH) demonstrated at autopsy, a positive electrocardiographic diagnosis was made in 85% by use of conventional criteria. However, in other studies designed to test the reliability of these criteria, it was found that a false-positive diagnosis was made in 10 to 15% of cases.

The electrocardiographic diagnosis of right ventricular hypertrophy (RVH) is more difficult. In electrocardiographic studies, confirmed by autopsies, the correlation has ranged from 23 to 100% while the number of false-positive diagnoses has been as high as 33%. The correct electrocardiographic diagnosis is more frequent in RVH due to congenital heart disease than to acquired heart disease.

The significance of the rSR' pattern in right precordial leads is discussed. Its occurrence in anatomic RVH and the problem of the electrocardiographic diagnosis of RVH in the presence of right bundle-branch block (RBBB) are reviewed.

Combined ventricular hypertrophy (CVH) is frequently missed in the electrocardiogram, the diagnosis having been made in only 8 to 26% of cases proved at autopsy.

The unreliability of the electrocardiographic diagnosis of LVH in the presence of left bundle-branch block (LBBB) is documented.

The precise electrophysiologic phenomena that occur in ventricular hypertrophy are still largely conjectural. The more commonly accepted hypotheses are reviewed.

The lack of close correlation between ventricular wall thickness or respective ventricular muscle mass and the individual electrocardiographic patterns is emphasized. Possible explanations for some of these discrepancies are presented. (R. C. Scott, The Correlation Between the Electrocardiographic Patterns of Ventricular Hypertrophy and the Anatomic Findings: *Circulation*, XXI: 256-291, February 1960)

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Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Arteriosclerosis Obliterans

The diagnostic term "arteriosclerosis obliterans" denotes a degenerative arteriopathy of the extremities and of the aorta and its branches that go to the extremities. It is characterized by occlusive lesions consisting primarily of atheromas which are often accompanied by fibrosis and calcification of the medial coat of the artery and which may be associated with thrombosis of varying extent.

The authors reviewed the records and made follow-up studies of a group of 520 nondiabetic patients who were less than 60 years of age at the time a clinical diagnosis of arteriosclerosis obliterans was made and who had had at least one determination of plasma cholesterol. The purpose of the study was three-fold: to gain information as to pathogenesis of atherosclerosis; to accumulate evidence regarding factors that influence prognosis as to life and preservation of limbs; and, to compare prognosis as to life and limb of groups with and without surgical procedures designed to restore arterial continuity.

FACTORS OF PATHOGENESIS

Sex. Of the entire group of 520 patients, 478 were men and 42 were women. This ratio is greater than that usually reported for white patients in this age group who have clinical evidence of coronary atherosclerosis. Normal secretion of estrogens by the premenopausal woman may tend to protect against atherosclerosis of the arteries of the lower extremities and may extend for several years after the menopause.

Plasma Cholesterol. The mean concentration of plasma cholesterol in men with arteriosclerosis obliterans was approximately 50 mg. per 100 ml. higher than that of either of the two control groups of men; the level in women was approximately 35 mg. per 100 ml. higher than that of the men with this disease. The mean concentration of plasma cholesterol was 250 mg. per 100 ml., or greater, in 48% of the men and 74% of the women.

Tobacco Smoking. At the onset of symptoms of arteriosclerosis obliterans, 97.5% of the men were smokers and 33% smoked 20 or more cigarettes a day. In a control group of male patients without this disease, 26% were non-smokers and 33% smoked 20 cigarettes or more a day. This suggests that tobacco smoking may produce some sort of peripheral arterial injury and may be a factor in localization of atherosclerosis in a certain small group of susceptible individuals. Also, it is possible that in some patients with atherosclerosis, tobacco smoking may be a factor in the secondary arterial thrombosis that occurs.

Obesity. With a weight of more than 200 lbs. in men and of more than 175 lbs. in women as an index of obesity, only 5% of the authors' series were obese. It would appear that in middle-aged nondiabetic patients, obesity is not commonly associated with arteriosclerosis obliterans and probably is not a significant factor in pathogenesis.

Hypertension. Of the study group, 25% had blood pressure greater than the arbitrary values of 150 mm. Hg. systolic and 90 mm. diastolic chosen as the upper limits of normal as compared to 9% in the control group of 100 male patients. It is noteworthy that three-fourths of the patients with arteriosclerosis obliterans did not have hypertension. It would appear that hypertension cannot be considered a frequent accelerating factor in the process of arteriosclerosis obliterans.

SYMPTOMS AND COMPLICATIONS

All 520 patients had a history of intermittent claudication in one or both lower extremities. This was the only symptom of occlusive arterial disease in 380 patients (73.1%). Rest pain was noted by 85 patients (16.3%) and was interpreted to be pain due to local tissue ischemia or pain due to ischemic neuropathy of larger nerve trunks. Ischemic ulceration or gangrene was observed in 55 patients (10.6%). The incidence of rest pain, neuropathy, ulceration, and gangrene was greater in patients whose proximal arterial occlusion was in the femoral artery than in those whose occlusion was in the aorto-iliac vessels.

A history of previous myocardial infarction or chest pain consistent with angina pectoris existed in 16% of the entire group. The incidence of clinical coronary arteriosclerosis is slightly greater in patients with occlusion of the femoral artery than in patients with aorto-iliac involvement.

TREATMENT

In general, the following basic regimen was recommended for all patients: abstinence from tobacco; protection of feet; low fat diet for those with increased plasma cholesterol; one or more courses of IM injections of deproteinized pancreatic extract for those with intermittent claudication; oscillating bed for those with ischemic rest pain, ischemic neuropathy, or ischemic ulcers or gangrene. Unilateral or bilateral surgical lumbar sympathetic ganglionectomy was performed on 44 patients; amputation of the leg was performed on 21 (4%) because gangrene was found to be extensive and unresponsive to conservative treatment. Only 2% of the patients with aorto-iliac disease required amputation of the leg at the time of their first visit while 5% of those with involvement of the femoral artery required amputation at that time.

PROGNOSIS

Survival Rates. Survival rates for the traced patients is significantly lower than that for the general population. The cause of death could not always be determined with accuracy, but in 76 patients (approximately 75%

of those known to have died in the follow-up period) the cause of death was probably arteriosclerosis of the coronary arteries.

<u>Percent Survival</u>	<u>3 years</u>	<u>6 years</u>	<u>10 years</u>
Normal population	96.0	92.8	83.0
Femoral artery occlusion	86.0	80.1	57.2
Aorto-iliac occlusion	81.9	73.0	46.6

The 5-year survival rate is significantly lower for patients who had clinical coronary arteriosclerosis and for those who had had a cerebrovascular accident than for those who did not. However, the authors consider that the lower survival rate for those with coronary disease is not influenced by the disease of the lower extremities.

Subsequent Amputation. The incidence of subsequent amputations during the 5-year period following original examination and diagnosis was 4.9% for the 465 traced patients, only 3% for those with intermittent claudication as the only symptom, 3.8% for those with more severe degrees of ischemia as manifested by rest pain or ischemic neuropathy, and 19.6% for those with gangrene or ulceration. Data indicate that ischemic ulceration or gangrene is of more serious import, insofar as survival of an extremity is concerned when the proximal site of occlusion is in the femoral artery than when it is in the aorto-iliac region.

Of the traced patients who smoked at the time of diagnosis and who survived 5 years, 88 had continued to smoke and 71 had abstained from smoking after the diagnosis was made. Of interest is the finding that 11.4% of all who continued to smoke required an amputation within the 5-year period while none who abstained from smoking required amputation during this period.

Because all patients of the series were treated before the advent of direct arterial surgery for segmental arterial occlusion, it is believed that the subsequent course of the disease in these patients may be used as a basis for comparative evaluation of results in patients subjected to direct arterial surgical procedures. (J. L. Juergens, N. W. Barker, E. A. Hines Jr., *Arteriosclerosis Obliterans: Circulation*, XXI: 188-195, February 1960)

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Radiation Therapy of Benign Conditions

Soon after their discovery in 1895, roentgen rays were put to practical use by physicians. Acute radiation reactions—local and systemic effects of large doses delivered in a short time—promptly manifested themselves and, in due course, their sequelae appeared.

In the face of current apprehension about use of roentgen rays, therapeutic radiologists are grateful to have physicians in other fields point out that "irradiation for benign conditions may produce tissue changes more

disabling than the original condition for which the x-rays were administered. " However, scientists should be able to objectively evaluate this question: How has the greater understanding of radiation hazards affected the indications and contraindications for the dosimetry and techniques of irradiation in benign conditions?

Cellulitis, Furuncles, Carbuncles. With the passing of the years, widespread and often unnecessary administration of chemicals has produced two thoroughly unpleasant results: drug reaction and resistant strains of bacteria. The lesson to be learned is plain—the use of these valuable materials should be reserved for a time of real need to fight infections which threaten to cripple or kill. The part that radiation can play in reducing their use is too often ignored.

Many questions about how radiation influences infections have never been fully answered. However, it seems definite that there is no direct bactericidal action, nor is there any direct increase of antibody production. The improvement which follows is probably due to the action of ionizing energy on the cellular exudate accompanying the inflammation and on the capillary bed.

Whatever the exact mechanism of its action, roentgen therapy is an adjunct of proved value in treatment of many infections. A nonspecific form of treatment, it stimulates the natural defenses of the body. It does not sensitize the patient and does not lead to development of resistant bacterial strains. The number of cases of cellulitis, furuncles, and carbuncles that can be cleared up by rest, hot compresses, and indicated surgical drainage would surprise young physicians who have entered practice since the use of antibiotics and chemotherapy has become rampant. The judicious supplementation of these simple measures with roentgen therapy helps to abort or localize many of the more threatening or stubborn infections. In truly difficult cases, antibiotics or chemotherapy are, of course, needed. But even in these cases the use of radiation can reduce the total amount of drugs or antibiotics given.

Exact comparison of results cannot be made, but the clinical conviction is overwhelming—a gentle prodding of the body's defense mechanism with small doses of roentgen rays is effective. Properly carried out, the procedure is safe and is a more conservative measure than use of chemotherapy or antibiotics.

Tuberculous Cervical Lymphadenitis. To a greater degree than most other infections against which irradiation at one time was a major defense, tuberculous cervical lymphadenitis is handled successfully by drugs. Many open cavity cases of pulmonary tuberculosis become drug resistant, but few cases of tuberculous cervical lymphadenitis do. That the drug resistant cases are few does not decrease the value of roentgen therapy in those instances.

Chronic Sinusitis; Chronic Lymphoid Folliculitis and Hyperplasia. Because of desirability of avoiding radiation exposure in children and the

efficiency of chemotherapy and antibiotics, roentgen therapy of acute infections in the upper respiratory tract usually is not recommended. However, with increasing bacterial resistance, chronic infections in this region occur more frequently and need to be considered. Chronic sinusitis and chronic lymphoid folliculitis and hyperplasia are not easily managed; failure to correct them may lead to deafness, asthma, and bronchiectasis. Roentgen therapy may give relief which will help the child get through a difficult period of growth and development without permanent disability. Use in adults has minimal attendant hazard and frequently is of considerable benefit.

Acute and Subacute Nonsuppurative Thyroiditis. The inflammatory reaction in some cases of thyroiditis may be an expression of immunity response to antibodies of thyroglobulin produced when it escapes from injured acini. When other measures—including antithyroid drugs and steroids—are not promptly effective and their withdrawal is followed by relapse, irradiation should be used. The mechanism of its action in this condition is unknown, but its effectiveness has been thoroughly documented.

As there is a possibility that small amounts of radiation over the thyroid in infancy and childhood may increase the incidence rate of carcinoma of that gland, radiation treatment of thyroiditis in the very young should be restricted. On the other hand, benefits of wise use of small doses of irradiation for thyroiditis in adults far exceeds the somatic hazard.

Warts. Of paramount importance is close cooperation between the dermatologist and radiologist. Neither one alone can accomplish as much as when working together. The treatment of mosaic warts is an example—irradiation makes the mosaic wart more amenable to subsequent treatment by the dermatologist.

It is recommended that irradiation be used as the initial form of therapy in subungual warts only. In others, medical measures are first given an adequate, but not unduly prolonged, trial. If the wart persists, radiation therapy is administered. If it still persists, the verruca is usually smaller and more superficial and can be treated medically again with greater hope of success.

Because of the greater susceptibility of youthful tissues to radiation injury, the younger the child, the more determined should be the medical effort to cure the lesion.

Herpes Zoster. Irradiation of involved posterior root ganglions often relieves the pain associated with herpes zoster. Possible causes for unnecessary failure are: (1) undue attention to skin lesions; (2) inadequate penetration of radiation; (3) insufficient number of treatments; (4) irradiation of too short a length of the cord—at least two segments above and below the suspected nerve roots should be included in the field.

Subacromial Bursitis. Symptoms of this condition requiring medical attention are usually encountered in the middle aged and elderly. Therefore, concern about hazards is a minor factor in deciding whether to use radiation. Irradiation has the greatest chance of success when the clinical diagnosis can

be confirmed by demonstration of calcification in the roentgenogram and when symptoms are of brief duration. The effect is due, presumably, to absorption of inflammatory elements with consequent relief from tension followed by healing. The longer the symptoms have been present, the greater will be the irreversible tissue damage.

In comparing results produced by different methods of treatment, it is important to know which treatment was used first. As most of the acute episodes will respond to the initial form of therapy, it is easy to misinterpret statistics. In a case in which the first method of therapy has failed, relief from any type of therapy is apt to be slow.

Tinea Capitis. Patients with this condition are usually school children, too young for irradiation of a benign condition to be undertaken lightly. Nevertheless, when other therapy fails, radiation epilation must be done. A new antibiotic, griseofulvin, may relieve the radiologist of this unpleasant necessity.

Benign Skin Disorders. New forms of topical therapy, steroids, and chemotherapeutic agents are meeting most needs in these areas, which include acne, and pruritus ani and vulvae. If a patient suffering from one of these conditions cannot be relieved by these means, he presents an unusual problem and it is not likely that adjunctive roentgen therapy can solve it.

Summary. Advances in drug therapy have eliminated roentgen therapy in some benign conditions and sharply reduced it in others. However, it still occupies an important place in this field and its usefulness in some conditions is increasing. With greater understanding of radiation hazards by the radiologist, indicated roentgen therapy for benign conditions can be administered without significant danger. (G. Cooper Jr., Radiation Therapy of Benign Conditions: Am. J. Roentgenol., 83: 538-550, March 1960)

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Respect the Skin

We are hearing and reading a good deal about postoperative infections and the various possible sources of contamination. It is important that we continue to critically review our techniques, habits, and beliefs so as to reduce the likelihood of such complications with their increased morbidity and mortality. The surgeon should be most critical of his own techniques and those of his associates. We must practice and teach respect for the skin. The skin is a wonderful creation that is a protective, defensive covering aiding in the temperature control of the body and in excretions. If treated and handled gently its defensive and reparative mechanisms will respond, giving good results.

The surface and crypts of the skin may harbor microorganisms dangerous to the host and to others contacted. Thorough cleansing of the hands before examining patients or changing dressings is elementary but too often disregarded.

The hands of all attending the sick may be the greatest hazard the patient encounters in the hospital.

Subcutaneous, intramuscular, and intravenous injections are important avenues of drug and fluid administration. Disastrous infections have occurred and may occur if preparation of the skin of the recipient and administrator are neglected prior to injection. Each injection carries a risk. Too many indicated and unnecessary injections are badly given.

In the operating room, cleansing of the hands of the surgical team and the operative area, even though routine, must be well done. When well cleaned, the skin is only clean, never sterile. The skin of the operative area should not be handled and palpated unless the operator plans to change his gloves before entering the deeper layers or body cavities. The skin edges of the wound and the exposed clean surface must be well covered throughout the surgical procedure and the edges again exposed at the time the skin is closed. When carefully protected, the sutures and ligatures will not drag along the exposed skin edges and carry organisms into the depths of the wound, nor will the operator continually be handling potentially contaminated instruments that are allowed to rest on exposed skin.

Fine ligatures and sutures are of excellent quality today, and their use greatly aids in lessening the amount of foreign material left in the wound. The skin edges approximated accurately without constriction or strangulation, with the aid of fine suture material, will give excellent results and minimal cause for wound infections. Heavy suture material for the skin should be of historic interest only.

Antibiotics and chemotherapy are great aids when needed, but should never replace the confidence developed in fundamental surgical principles. Respecting the skin is basic whether the patient's condition is medical or surgical, and the surgeon particularly should practice and teach it.

(E. H. Fell, Respect the Skin, Editorial: Am. J. Surg., 99: 265, March 1960)

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Indications for Preoperative Transfusions

The preoperative transfusion of blood has been asserted to be beneficial when the patient to be operated on has cancer or is cachectic. This assertion was based on the discovery that the cachectic person usually had a blood volume significantly smaller than that which it was estimated he had when in good health.

Studies have shown that the starved person possesses a blood volume relative to body weight that is equal to, or proportionately greater, than that which he had before the weight was lost. However, the mass of red cells in the circulation of the starving individual falls roughly in proportion to the loss of weight.

There are some who have recommended the transfusion of plasma to the malnourished patient before an operation because it was presumed that he suffered from a plasma protein deficit. This attitude was based on the findings that the concentrations of protein in the plasma of the malnourished sick person were often below those characteristic of the plasma of persons in good health.

To date, all evidence indicates that upon comparing the blood volumes and total circulating plasma proteins of the malnourished ill person with the blood volumes and total circulating proteins of normal lean individuals of similar stature, the malnourished ill person is usually found to possess per unit of body mass a blood volume slightly larger and a plasma protein mass at least equal to these parameters in the normal lean person.

These observations have distinct clinical significance. The belief that the malnourished sick person suffers from chronic oligemic shock must be abandoned. The transfusion of blood and transfusion of plasma to correct theoretical deficits in red cell and plasma protein masses in the malnourished sick patient are unwarranted unless a deficit of the red cells or circulating protein relative to body weight exists. The only way to determine surely the need for transfusing blood or plasma preoperatively into persons who have not lost blood is to measure the total red cell volume and plasma volume with methods that are accurate.

The moderate reduction of concentrations of hemoglobin and red cells that often accompanies cachexia in persons who do not lose blood does not constitute an anemia; the red cell volumes of these patients usually still bear the same relationship to the individuals' nonedematous weights that are observed in lean or normal persons. The hemoglobin values and red cell counts are usually low because the cachectic person's plasma volume per unit of body mass is larger than in a well-nourished person. The cachectic person should not be looked upon as being anemic so long as his red cell mass bears the same relationship to a unit of his weight as does that of a well-nourished person. On the other hand, cachectic persons may have a true anemia with reduced red cell volumes but normal total blood volumes relative to body weight.

The decrease in circulation time which accompanies an anemia is indicative of the compensatory changes in the circulation which provide for maintenance of a constant supply of oxygen to the tissues in the face of a reduced carrying capacity of the blood. Thus, the effect of an anemia will depend on the circulatory reserve of the individual. It will also depend on the varying needs of the tissues for oxygen; the effect, if any, of surgical operations on this factor is unknown. If there is no increase in the rate of oxygen consumption during operation over that of the resting state, an already tolerable anemia need not be corrected.

Troubles associated with the transfusion of blood are rather protean, and the authors believe that malnourished patients may be particularly

susceptible to transfusional circulatory overloading. In these patients, the biologic response to transfusion of whole blood is determined by the ability of the organism to eliminate from the circulating fluids the plasma and plasma protein portion of the infusion while retaining the red cells. Fortunately, the truly anemic individual is, with but few exceptions, capable of making these adjustments. However, at times, in individuals having blood volumes of 100 ml./Kg. or more, peripheral edema, or incipient cardiac failure, transfusion of blood is attended by acute pulmonary edema and death. In these patients, administration of packed red blood cells might be more appropriate.

Other reasons given for transfusing the cachectic patient are:

(1) "Give him a transfusion to pick him up a bit." Are cachectic individuals who die following transfusions "picked up?"

(2) "He hasn't been eating—give him some blood, it's superb food." The caloric equivalent of the proteins, fat, and carbohydrate in a liter of blood is about 900 calories.

(3) "His hemoglobin is low—give him a transfusion so that his wound will heal." No basis exists for this concept.

(4) "He is starved and won't stand the operation well. I won't operate on him until he has been transfused." This concept also has been disproved.

So far as extant evidence goes, the answer to the question, "When should transfusions of blood be given to cachectic persons preoperatively?" is in no way different from that pertaining to the case of the well-nourished. Give him blood preoperatively: (1) during, or after, acute loss of blood which has been sufficient to produce physiologically significant oligemia; (2) when there exists an oligemic anemia. (J. C. Peden Jr., et al., A Consideration of Indications for Preoperative Transfusions Based on Analysis of Blood Volumes and Circulating Proteins in Normal and Malnourished Patients With and Without Cancer: Ann. Surg., 151: 303-318, March 1960)

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BUMED NOTICE 6150

28 March 1960

Subj: Standardization of Department of Defense Prescription Form
(DD Form 1289)

This directive provides that officers of the Medical and Dental Corps and civilian physicians employed by the Navy shall use DD Form 1289 for all official prescriptions when stocks of NavMed 148 forms are exhausted.

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget (19 June 1961).

Captain Barr Receives Certificate
of Exceptional Service

A Bureau of Medicine and Surgery Certificate of Exceptional Service was presented to Captain Norman L. Barr MC USN (Ret) on 28 March 1960 during ceremonies in the office of the Surgeon General of the Navy, Rear Admiral Bartholomew W. Hogan.

Admiral Hogan presented the Certificate in recognition of research work accomplished by Captain Barr during his naval career. A former Director of the Bureau of Medicine and Surgery's Astronautical Division, Captain Barr retired from the Navy on 1 September 1959 following more than 21 years of active service.

The citation on the Certificate states:

"For his brilliant research which has enhanced the readiness and competence of the naval services in Fleet Defense and its medical-aeronautical and astronautical operations.

An indefatigable and purposeful worker, he succeeded, through his researches, in increasing significantly the capabilities of pilots and crews to perform their function of protecting the Fleet. He developed systems, now in use by the Navy, for simulated instrument-flying conditions in instrument-training aircraft cockpits. He was the first to determine and explain the need for artificial lights in aircraft cockpits for high-altitude daylight flight. He was also the first to measure and report the important effects of atmospheric brightness on the visibility of cockpit instruments. He designed instruments to compute visibility range and to measure physical variabilities influencing visibility. He perfected a system for reducing the hazards due to the blinding effects of glare from aircraft searchlights during night attacks. He devised systems for gathering and automatically recording physiological data from airborne pilots, and from animal and human occupants of earth-orbiting vehicles, transmitting it to the ground by radio and relaying it to a central laboratory by radio and telephone from any part of the world.

In recognition of these extraordinary achievements, as well as for numerous other significant contributions to aviation medicine, the Bureau of Medicine and Surgery, with pleasure and justifiable pride, awards him this Certificate of Exceptional Service for his truly outstanding career in the service of his country." (TIO, BuMed)

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ACP Postgraduate Course
Early Detection and Prevention of Disease

A postgraduate course—Early Detection and Prevention of Disease—sponsored by the American College of Physicians, is to be presented by the Department of Public Health and Preventive Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa., 9 - 13 May 1960.

The course will present a critical evaluation of possibilities and techniques for diagnosis of disease at an early stage and prevention of disease where prevention is possible. Special emphasis will be placed upon the detection of disease before the development of readily recognized signs and symptoms. The course will include an up-to-date review of the practical experience of clinics and individuals who have been actively engaged in efforts to detect asymptomatic disease and to prevent its progress and complications. Consideration will be given to established methods; to procedures which may still be considered experimental; and to frank and objective appraisal of the values of methods and procedures.

Applications are desired from eligible Medical officers who meet criteria as outlined in BuMed Instruction 1520. 8 and are currently assigned to duty in the Middle Atlantic States. Application should be made to the Chief, Bureau of Medicine and Surgery via chain of command. Tuition fees will be paid by the Bureau and travel and per diem orders issued for attendance of approved candidates.

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Recent Research Reports

U. S. Naval Medical Research Institute, NNMCI, Bethesda, Md.

1. The Hydrogen Ion Titration Curve of a Polynucleotide Capable of Undergoing a Helix-Coil Transition. NM 02 01 00.01.11, 14 August 1959.
2. Changes in Growth of Trypanosoma Lewisi After Multiple Transfer in Normal and Calorically-Restricted Heterologous Mouse Hosts. NM 52 02 00.01.07, 11 September 1959.
3. The Heterologous Host as a Research Tool in Nutrition Studies on Parasitic Protozoa. Lecture and Review Series No. 59-4, 11 September 1959.
4. Growth of the Rat Trypanosome During 220 Serial Passages in Adequately Fed Mice. NM 52.02 00.01.06, 11 September 1959.
5. Growth of the Rat Trypanosome During 300 Serial Passages in Calorically Restricted Mice. NM 52 02 00.01.05, 11 September 1959.
6. Kinetics of the System a-Chymotrypsin Methyl Hippurate Water Hydroxylamine: The Role of Water in Enzymatic Hydrolysis. NM 01 01 00.02.10, 8 October 1959.

7. Survival of Spermatozoa Following Drying. NM 71 01 00.07.04, 13 October 1959.
8. Cholesterol Biosynthesis in Bullfrog Sciatic Nerve. Report No. 15. II. Concentration Dependence of C₂-Unit Incorporation. MR005.06-0010.01, Report No. 15, 23 October 1959.
9. Some Toxicological Properties of a New Series of Aryl Ethers Derived from Trans-2-Aminocyclohexanol. Report No. 16. MR005.06-0010.01, 23 October 1959.
10. An Enzymatic Examination of the Structure of the Collagen Macromolecule. MR005.08-0001.02. Report No. 11, 6 November 1959.
11. Studies with Drug-Resistant Strains of Psittacosis Virus. I. Comparison of Four Strains Used In Mixed Cultures. MR005.09-1200.03, Report No.1, 16 November 1959.
12. Further Studies of Small Vessel Anastomosis and Replacement in the Dog. I. Plastic Prostheses. II. An Unidentified Host Variable Affecting Results. MR005.02-0006.02, Report No. 1, 20 November 1959.
13. Localized Cytomegalic Inclusion Disease of Lacrimal Glands in the NMRI-D Strain Caries Susceptible Rat. MR005.12-5000.01, Report No. 7, 4 December 1959.

U. S. Naval Medical Research Laboratory, U. S. Naval Submarine Base,
New London, Conn.

1. *An Exploratory Study of the Relationship of Autonomic Resiliency to Manifest Anxiety and Selected Personality Traits. Report No. 307, NM 23 02 20.01.05, March 1959.
2. The Personal Inventory Barometer (PIB). II. Obverse Factor Analysis with PIB Items as a Validating Technique with Submarine School Criteria. Report No. 2, Subtask No. 1, NM 23 02 20, 6 May 1959.
3. Mechanisms in Development of Interstitial Emphysema and Air Embolism on Decompression from Depth. Report No. 300, NM 24 02 20.02.01, 20 July 1959.
4. *The Loudness Difference Limen for Tones in Noise. Report No. 314, NM 22 01 20.02.01, August 1959.
5. The Relationship of Tattoos to Personal Adjustment Among Enlisted Submarine School Volunteers. Report No. 319, NM 23 02 20.01.07, 17 September 1959.
6. Dental Observations Made While Wintering in Antarctica in 1956 - 1957. Report No. 302. NM 24 01 20.06.01, 15 October 1959.
7. *Approaches to the Study of Motivation of Officer Candidates for the Submarine Service. Report No. 321, MR005.14-2100.02.02, 16 October 1959.
8. How Red Is Red? Report No. 303. NM 22 01 20.01.07, 18 October 1959.
9. Comparison of High Acuity Scores on Snellen and Ortho-Rater Tests. NM 23 01 20.04.01, 20 October 1959.

- 10.*Bibliography of Sensory Deprivation, Isolation, and Confinement. MR005. 14-2100. 03. 04, January 1960.
11. Memorandum Report 60-2: Recommendations for Minimal Red Light Levels on Board Submarines. NM005. 14-1100. 01. 06, 14 January 1960.
12. Multiple Checkerboard Acuity Tester. Memorandum Report 60-3. MR005. 14-2001. 03. 03, 19 January 1960.
13. Auditory Fatigue Following High Frequency Pulse Trains. Report No. 306, NM 22 03 20. 02. 01, 21 January 1960.
14. Underwater Visual Communication. Memorandum Report 60-5. MR005. 14-1001. 01. 11, 16 February 1960.

* Items indicated above were inadvertently listed under Reports from Medical Research Unit No. 3, Cairo, Egypt in the Medical News Letter of 19 February 1959, Vol. 35, No. 4.

U.S. Naval Radiological Defense Laboratory, San Francisco 24, Calif.

1. The Estimation of the Non-Recuperable Injury Caused by Ionizing Radiation. USNRDL-TR-226, 18 April 1958.
2. Studies on Transfer of Antibody Formation by Iso-and Hetero-Transplants. USNRDL-TR-297, 9 February 1959.
3. Lethal Graft Versus Host Reaction Induced in X-Irradiated F₁ Hybrids by Parental Strain Leukocytes. USNRDL-TR-296, 10 February 1959.
4. Gastrointestinal Function During Exposure to X-Rays. USNRDL-TR-299, 18 February 1959
5. The Relation of the Metabolism of Sulfobromophthalein Sodium to Its Blood Clearance in the Rat. USNRDL-TR-298, 18 February 1959.
6. Liver Function in Regenerating Rat Liver. CrPO₄ Colloid Uptake and Bile Flow. USNRDL-TR-320, 15 April 1959.
7. Inhibition of DNA Synthesis by Sodium Ions. USNRDL-TR-319, 12 May 1959.
8. Studies on the Mechanism of Secondary Disease: The Parental-F₁ Hybrid Radiation Chimera. USNRDL-TR-324, 13 May 1959.
9. Antigenic Stimuli for Transplantation Immunity to Rat Bone Marrow Heterografts in Lethally X-Irradiated Mice. USNRDL-TR-254, 7 July 1959.
10. Some Factors Which Influence Radiation Conditioned Avoidance Behavior in Rats. USNRDL-TR-345, 28 July 1959.
11. Conditioned Avoidance Behavior Induced by Low Dose Neutron Exposure. USNRDL-TR-345, 28 July 1959.
12. Radiation Induced Conditioned Avoidance Behavior in Rats, Mice, and Cats. USNRDL-TR-351, 28 July 1959.
13. Influence of Diet Fat on Post-Irradiation Growth and Food Utilization in the Rat. USNRDL-TR-351, 13 August 1959.
14. Acceptance of Rat and Mouse Lung Grafts by Radiation Chimeras. USNRDL-TR-376, 12 October 1959.

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From the Note Book

The Surgeon General Attends SHAPE Meetings. The Surgeon General of the Navy, RADM Bartholomew W. Hogan, attended the Medical Conference of the Surgeons General of the NATO countries at SHAPE Headquarters in Paris, France, 6 - 8 April 1960. Following the conference, ADM Hogan visited several naval medical activities in the European area, and at the invitation of the Surgeon General of the Army, visited U.S. Army Hospitals in Germany and Italy where Navy patients were hospitalized.

Three Navy physicians specializing in submarine medicine—CAPT Gerald J. Duffner, LCDR John H. Ebersole, and LCDR Richard T. Arnest—accompanied ADM Hogan to the conference for the Navy presentation, "Medical and Health Problems Associated with Nuclear Submarine Operations." (TIO, BuMed)

Command Changes at NNMC. In ceremonies at the National Naval Medical Center, Bethesda, Md., 31 March 1960, RADM Bruce E. Bradley MC USN relinquished command of the Center and terminated thirty-three and one-half years of active duty. ADM Bradley will become Medical Director of the Bankers Trust Company, New York City, and will reside in Tenaflly, N.J. RADM Frank P. Kreuz Jr. MC USN, formerly Deputy Commanding Officer of the Center, and Commanding Officer of the Hospital at the Center, has assumed the vacated command. CAPT Robert B. Brown MC USN, Chief of Surgery at the Hospital since 1951, stepped up to become Commanding Officer of the Hospital.

Project RAM Field Trip. On 23 March, a research team began a 22-day field trip to visit eleven laboratories and contractor facilities for on-the-spot review of the uses to which Project RAM (Research Aviation Medicine) could be utilized in research on a cooperative basis. These included various Naval laboratories and National Aeronautics and Space Administration facilities. Since its beginning in 1947, Project RAM, under the sponsorship of the Office of Naval Research and the Naval Medical Research Institute, has developed systems of medical instrumentation and air-to-ground telemetering. With the development of the present astronautic and satellite research programs, the experience gained over the past 13 years is expected to assist greatly in the instrumentation phases of research programs being planned or already under way. (TIO, BuMed)

Blood Donations to Turkey. In conjunction with medical personnel of the Red Crescent—the Turkish Government directed agency which is the counterpart of the American Red Cross—the Medical Department of the USS FORRESTAL (CVA-59), under the direction of CDR R. E. Luehrs MC USN, recently organized and assisted in collecting 204 pints of blood from donors

aboard the carrier as she lay at anchor in the Bosphorus at Istanbul, Turkey. This contribution, bolstering the reserve of the one-year old Turkish Blood Bank, utilized only a fraction of the potential donors of the ship—4200 officers and men, all catalogued as to standard and Rh factor type.

Cold Weather Medicine and Injury. The Surgeon General of the Navy encourages submission to the Editor-in-Chief of ALASKA MEDICINE reports in the general field of cold weather medicine with special reference to research and clinical management of cold injury. This journal, published quarterly, is edited by William J. Mills Jr., a Reserve Medical officer who is conducting clinical and laboratory studies on cold weather injury under an ONR contract. Studies on rapid rewarming with parallel studies on enzyme responses in relation to recovery are of special interest. Dr. Mills expects to devote one or more pages of each issue of the journal to Navy medicine. Manuscripts, addressed to 742 K Street, Anchorage, Alaska, should be typewritten, double-spaced—preferably in duplicate—with all tables and illustrations accompanied by brief legends.

Berry Plan Surplus. For the first time since its inception about 5 years ago, the Berry program will produce a surplus of physicians for the Armed Forces this summer. Notices have been sent to 105 residents who expected to start active duty this year that billets are not available for them in their specialties and uniforms of choice. The number represents about 12% of the 1960 "graduating" group. The Army and Navy are still short in some specialties while fully staffed in others. (Washington Report of the Medical Sciences, April 4, 1960)

Association of Military Surgeons. RADM Richard A. Kern MC USNR (Ret), President of the Association, announces the 67th annual convention at the Hotel Mayflower, Washington, D. C., 31 October to 2 November 1960. The theme of the convention will be "The Military Role in Medical Progress." RADM Curtiss W. Schantz DC USN, Assistant Chief of the Bureau of Medicine and Surgery (Dentistry), has been appointed as General Chairman. CAPT Clifford P. Phoebus MC USN, Director, Astronautical Division of the Bureau, will be Chairman of the Scientific Program Committee.

Psychologic Aspect of Thyrotoxicosis. Heretofore, the role of the personality in thyrotoxicosis has been stressed, and frustration of needs has been proposed as the predisposing factor in the onset of the disease. The authors conclude that this factor has been overstressed, and that thyrotoxicosis is a metabolic disease manifested by impaired psychobiologic integration involving particularly the autonomic system. The adequately treated thyrotoxic patient closely resembles the normal person. (L. Robbins, D. Vinson, J. Clin. Endocrinol., January 1960)

New Dimensions of Submarine Medicine. This interesting report covers the significant environmental factors encountered in the first years of nuclear-submarine operation. The details of a 60-day total submergence patrol are presented. (LCDR John H. Ebersole MC USN, New England J. Med., March 24, 1960)

Bacterial Endocarditis. In the January A. M. A. Arch. Int. Med., a summary of experiences at the Johns Hopkins Hospital since 1945 in management of patients with bacterial endocarditis is presented by Philip A. Tumulty. A vigorous program of therapy is recommended—a program of management likely to cure the largest number of patients because "it may well be necessary to overtreat several in order to avoid undertreating a few."

"Second-Look" Surgery. This term has been used to designate operations which are performed upon asymptomatic individuals without clinical evidence of residual tumor 6 to 9 months after the primary resection of the lymph node-positive cancer. The authors present the case of adrenocortical carcinoma which was negative at the time of the "second look." However, approximately 2 years later the patient returned with an inoperable recurrence in the retroperitoneal tissue and liver. (LT Y. Jacobson MC USN, CAPT J. Richardson MC USN, Surgery, March 1960)

Lymphomas. The January Annals of Internal Medicine presents a combined clinic on lymphomas from the College of Physicians and Surgeons, Columbia University. Some phases of basic study which provide an understanding for methods of therapeutic approach are presented.

Acute Diabetic Episode with Remission. An unusual case of a 39-year old patient is reported with remission occurring following an acute episode of diabetic acidosis and coma. After several weeks of insulin therapy, the patient remains aglycosuric on diet regulation alone. A standard 5-hour glucose tolerance test is normal; the test following cortisone reveals latent diabetes. (LT R. Barr MC USNR, J. Clin. Endocrinol., March 1960)

Urinary Tract Infections. Based on observations of effects of treatment with sulfadimethoxine of 65 patients with urinary tract infections, the authors conclude that the drug constitutes a valuable and safe chemotherapeutic agent for treatment. All patients received 0.5 gm. twice a day for 3 days followed by 1.0 gm. daily for 7 days for acute cases, and 1.0 gm. daily for 20 days in chronic infections. (J. Faulkner, A. Morrison, J. Urol., February 1960)

Treatment of Angina Pectoris. A new sustained-action capsule form of pentaerythritol tetranitrate (Duotrate) enabled 76% of patients observed to reduce their intake of nitroglycerine by at least one-third, or to eliminate it completely. Side reactions were few and negligible. (M. Plotz, Am. J. Med. Sci., Feb. 1960)

Xanthines in Angina Pectoris. The author considers that recent observations do not confirm that xanthines increase cardiac work proportionately more than coronary flow. A hydro-alcoholic solution of theophylline, administered orally, was shown to be effective in controlling symptoms and in modifying electrocardiographic response to standard exercise, because of rapid absorption. The author proposes that xanthine derivatives, both for IV and oral use, should be reinstated as valuable agents in treatment of angina pectoris and other coronary disease states. (H. Russek, Am. J. Med. Sci., February 1960)

Myocardial Revascularization. Searching for a substance to stimulate augmented circulation to the myocardium from the pericardium, the authors employed thin sheets of Ivalon sponge. Fourteen patients have undergone surgery with implantation of the sponge and all have shown encouraging improvement. An incidental observation, when making preliminary studies with animals, showed the development of vascular spaces in the myocardium which connected with the coronary arteries on one side and the ventricular lumen on the other—arterio-luminal vessels. (A. Vineberg, et al., Surgery, February 1960)

Smoking and Peripheral Circulation. As a result of studies at the Mayo Clinic and Foundation, it is indicated that in the normal person tolerance does not develop to tobacco so far as vascular effects are concerned; the blood pressure and pulse rate increase and the skin temperature of the extremities decreases on smoking tobacco; nicotine appears to be the most important factor, and alcohol does not nullify the effect. The authors consider that the evidence that smoking plays a role in progression of peripheral vascular disease is no longer controversial. (G. Roth, R. Shick, Dis. Chest, February 1960)

The Gastric Antrum. The Surgery section of the February American Journal of the Medical Sciences presents a comprehensive review of the gastric antrum and its physiology. The least understood area of the stomach, the antrum is considered by some to hold the key to the surgical approach of ulcer in the future.

Amphotericin in Histoplasmosis. Reporting use of Amphotericin in 30 patients, the conclusion is that the drug is effective but is primarily suppressive. In view of the toxic effects, purification and isolation of the active principle is indicated. This indicates a need for further study and development of other antifungal agents which can be used in conjunction with Amphotericin, in addition to study of other methods of administration of the drug. (J. Yates, et al., Dis. Chest, February 1960)

RESERVE**SECTION**

Screening for Officers Not Available
for Mobilization

Since 1955, approximately 35,000 Standby Reserve officers have been declared not available for mobilization by the Director of Selective Service. Under law, they cannot be involuntarily ordered to active duty in the event of mobilization.

Therefore, to insure the availability of Reserve officers, it has become necessary to establish a policy for eliminating those officers who could not be ordered to active duty in time of war or national emergency.

The first step in this process will take place in April 1960. Standby Reserve officers who have been declared not available for active duty will be given an opportunity to make themselves available for mobilization.

Each officer will receive a letter from the Chief of Naval Personnel containing a "declaration of availability." If this declaration is completed and returned, the officer may remain in the Standby Reserve—Active, if otherwise eligible. The Director of Selective Service will accept this voluntary agreement.

Officers who do not state their availability will be transferred to the Inactive Status List under the provisions of Article H-30321(5)(f), BuPers Manual. The transfer will be effective at 2400 on 30 June 1960.

However, an officer who wishes to remain in the Standby Reserve—Active, and who is prevented from declaring his availability by extenuating circumstances, may request retention by submitting a letter to the Chief of Naval Personnel by 1 June 1960.

Officers who do not wish to declare their availability for mobilization may, of course, transfer to the Retired Reserve or resign—if they are eligible.

Officers who are transferred to the Inactive Status List because they are not available for mobilization will no longer be able to earn retirement credit. Officers who have earned 50 retirement points in fiscal year 1960 will, of course, have that year credited as a year of satisfactory Federal service. After 1 July 1960, however, officers who are declared not available for mobilization will be afforded the opportunity as outlined above, and if they are unable to resolve their status shall be transferred to the ISL immediately. Thus, they will be unable to attain a year of satisfactory Federal service for the year in which they are transferred to the ISL.

Officers on the Inactive Status List will be solicited before they complete their third year on the ISL; at that time, they will be given an opportunity to (1) return to an active status if otherwise eligible and available for mobilization; or (2) retire or resign if eligible; or (3) be referred to the Naval Reserve Officer Mobilization Disposition Board with the recommendation that they be discharged. (The Naval Reservist, March 1960)

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ANA Convention

The Biennial Convention of the American Nurses Association will be held 2 - 6 May 1960, Miami Beach, Fla. A military program has been planned in conjunction with the professional meeting. Announcement of the time and location of the meeting will be made at the Reserve desk on the day of registration. A social program for all Navy Nurse Corps officers—active, inactive, retired—and friends has been planned for Wednesday, 4 May 1960, 5 - 7 p. m., at the Algiers Hotel.

One retirement point may be credited to eligible Naval Reserve Nurse Corps officers on inactive duty for attendance at selected sessions of at least 2 hours per day. A maximum of 4 retirement point credits are authorized per eligible officer for the period 2 - 5 May 1960.

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American Board Certifications - Inactive Reserve Officers

American Board of Dermatology

LT Richard Mihan MC USNR

American Board of Obstetrics and Gynecology

LT John N. McNair MC USNR

CDR Robert L. Stone MC USNR

LTJG Edgar B. Sylvester MC USNR

American Board of Orthopedic Surgery

LT Eugene E. Bleck MC USNR

LTJG Thomas C. Leinbach MC USNR

LCDR Ralph Lusskin MC USNR

American Board of Pathology

LT Jacob Malin MC USNR

LT Rene A. Fontaine MC USNR

American Board of Pediatrics

LCDR Thomas E. Frothingham MC USNR
LT Robert L. Nolan MC USNR
LT Arnold B. Victor MC USNR

American Board of Psychiatry and Neurology in Neurology

LT John F. Kurtzke MC USNR

American Board of Psychiatry and Neurology in Psychiatry

CDR Joyce Perrin MCW USNR

American Board of Radiology

LT Curtis F. Ahrens MC USNR
LT Walter J. Russell MC USNR
LT Ollie E. Southard MC USNR

American Board of Surgery

LT Charles H. Boggs, MC USNR
CDR Martin Donelson Jr., MC USNR
LT Neal A. Goldsmith MC USNR
LT Andrew L. Karavitis MC USNR
LCDR Leo E. Robertson MC USNR

American Board of Surgery and Board of Thoracic Surgery

LT Thomas F. Boyd MC USNR
LT Hobart M. Proctor MC USNR
LT William H. Sewell Jr., MC USNR

American Board of Urology

LCDR John M. Kennelly Jr. MC USNR
LT Harold J. McLaren Jr., MC USNR
CDR Stanley J. Okulicz MC USNR

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NOTE: In the Medical News Letter, Vol. 35, No. 3 (5 February 1960) p. 21, the affiliation of CAPT Paul R. Leberman MC USNR with the Graduate School of Medicine, University of Pennsylvania, should have been identified as Assistant Professor of the Division of Urology. The Chief of Urology at the Graduate Hospital of the University of Pennsylvania is Dr. Harry M. Burros.

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AVIATION MEDICINE DIVISION



High Altitude Balloon Research and Development Programs

The STRATOLAB research and development program employing manned balloons was initiated by the Office of Naval Research to meet requirements of the U. S. Navy in the field of high altitude research. Carried out in collaboration with the Bureau of Naval Weapons and the Bureau of Medicine and Surgery, it supplements the SKYHOOK project which uses unmanned balloon flights and provides an opportunity for the conduct of basic research not otherwise possible.

The STRATOLAB program objective is "to provide a laboratory facility for observers in the stratosphere to conduct research that cannot be done by existing techniques." The aim is to conduct unique experiments and make scientific measurements never before possible at altitudes ranging to 100,000 feet. The capabilities of human observers, various observational equipment, and the high altitude potentialities of the SKYHOOK type plastic balloons are combined to provide a stable stratospheric laboratory for studies in astronomy, aeromedicine, aerology, cosmic rays, atmospheric physics, astrophysics, geophysics, and military science. Valuable experience gained from numerous SKYHOOK flights contributed to the success of the STRATOLAB program.

Present day high altitude research aircraft reach altitudes above 100,000 feet. They remain above 80,000 feet for only brief periods of time, whereas the STRATOLAB balloon platform permits the collection of data over a period of many hours.

An official world altitude record for manned balloon flight was set by CAPTs Orvil A. Anderson and Albert W. Stevens of the U. S. Army on 11 November 1935 when Explorer II reached a height of 72,395 feet. Jointly sponsored by the U. S. Army and the National Geographic Society, Explorer II took off approximately 11 miles southwest of Rapid City, S. D., landing approximately 12 miles south of White Lake, S. D.

The Explorer II gondola carried 4 tons of payload and weighed about three and one-fourth tons. The balloon had a volume of 3,700,000 cubic feet and weighed about 5,000 pounds. In contrast, the STRATOLAB balloon weighs less than one-half a ton, lifts a total take-off weight of about one ton and has a volume of 800,000 cubic feet. The magnesium gondola of Explorer II was 9 feet in diameter compared with 7 feet 2 inches for the one-eighth inch thick aluminum gondola used in STRATOLAB.

HISTORICAL BACKGROUND

The first plans of the Office of Naval Research for a manned balloon flight into the upper atmosphere were made in 1946. At that time, it was realized that a stable platform from which scientific observations could be made was needed to gather information of value in connection with future high altitude flight. The basic problem was to find a vehicle capable of carrying a payload to sufficient altitude and remaining there long enough to make the desired observations. Inherent limitations of planes, rockets, and rubber balloons used in high altitude studies precluded their use in maintaining observers in the stratosphere for extended periods.

The initial project, HELIOS, under contract with General Mills, Inc., required the construction of plastic balloons that would make possible flight to the stratosphere with a manned gondola equipped with scientific instruments. It was anticipated that the balloon-borne gondola would remain at a ceiling of 100,000 feet for about 10 hours and would collect data during the entire flight from launch to recovery.

Among the principals working on the project were Doctor Jean Piccard who is now Professor Emeritus of Aeronautical Engineering, University of Minnesota; Mr. O. C. Winzen, President of Winzen Research, Inc.; and CDR G. W. Hoover USN, then with the Naval Training Device Center. The concept of this system was the use of a thin plastic material which would permit a reduction in the weight of the balloon itself to only a fraction of the weight of rubberized balloons. It was planned to use a cluster of such plastic balloons in order to reach a very high altitude.

Although the first manned plastic balloon flight operating under ONR contract occurred in 1949, plans for manned balloon flights were abandoned because the technology of plastic balloon manufacture was not sufficiently developed. The studies, however, definitely proved the feasibility of using plastic balloons to take scientific instruments to high altitudes and maintain them there for periods ranging from a few hours to a day or more. Such unmanned flights would provide some of the desired information, but were not acceptable as a substitute for manned flights.

Accordingly, the Office of Naval Research initiated project SKYHOOK and the first flight of a SKYHOOK balloon developed by General Mills, Inc., occurred on 25 September 1947. Launched at St. Cloud, Minn., and carrying a payload of 63 pounds, it soared to an altitude of more than 100,000 feet before descending at Eau Claire, Wis. Since that time more than 1,000 such flights have been made from locations within the United States and Canada, and from naval vessels in the Atlantic, Pacific, Caribbean, and Northern waters. Winzen Research, Inc. began constructing plastic balloons under ONR contract for unmanned flights into the stratosphere. The G. T. Schjeldahl Company of Northfield, Minn., and Raven Industries of Sioux Falls, S. D. also construct plastic balloons for high altitude research.

Once the feasibility of using plastic balloons for high altitude research was demonstrated, many and varied projects developed. Throughout the development of the art of plastic ballooning techniques, General Mills, Winzen Research, and the University of Minnesota, all under ONR contract, have held leadership in this field.

Among the SKYHOOK flights and projects which have taken place, the following have particular significance: In 1948, the first successful three-balloon cluster was launched. In 1949, the first shipboard SKYHOOK launch took place from the USS NORTON SOUND. Nearly 300 shipboard launchings have occurred since that time.

Project ROCKOON, which featured small Deacon rockets lifted to about 70,000 feet and released from a SKYHOOK balloon, was held in Arctic waters during 1952.

On 7 September 1956, the University of Minnesota launched a giant Mylar plastic balloon developed by the G. T. Schjeldahl Company to set an unofficial balloon altitude record of 145,000 feet for unmanned balloons.

On 18 May 1954, the largest plastic balloon ever built, the super SKYHOOK, was launched for the U. S. Navy by General Mills, Inc., from the University of Minnesota airport. It soared to an altitude of 117,000 feet. The volume of the balloon was more than three million cubic feet and it lifted about 400 pounds of scientific instruments useful in gathering information on cosmic rays.

In 1957, the U. S. Navy began an operational serology system known as TRANSOSONDE (trans-ocean sounding) which consisted of almost daily balloon flights across the Pacific Ocean from Japan. On 25 September 1957, the tenth anniversary of the first SKYHOOK flight, project STRATOSCOPE used an unmanned SKYHOOK balloon to carry a special solar telescope aloft to 81,000 feet which obtained the sharpest photographs ever taken of the sun. Recent U. S. Air Force projects, such as MAN-HIGH and FAR SIDE have also utilized the balloon techniques developed for SKYHOOK and other ONR balloon projects.

The purpose of SKYHOOK flights has been to obtain cosmic ray, meteorological, and other geophysical data. Although the Office of Naval Research originated Project SKYHOOK, in recent years the cosmic ray studies have been supported additionally by the Atomic Energy Commission.

Project SKYHOOK contracts have stimulated research resulting in important improvements in the relatively new field of plastic balloon technology and the complex interrelations between the balloon vehicle and the atmosphere. Development of plastic balloons, ground-handling equipment and launching methods as developed by General Mills, Inc., Winzen Research, Inc., and the University of Minnesota has reached the stage where the technical capability to conduct manned plastic balloon flights into the stratosphere now exists.

Both Aerojet-General and Douglas Aircraft under ONR contracts have analyzed problems and determined requirements for high speed, high altitude flight. In the aeromedical field, the Aerojet study showed that more information was needed on cosmic radiation, gravity free state, cabin environment,

man-machine integration, the effects of high altitude on vision, acceleration and deceleration, and escape. Needed data on all except the gravity free state and acceleration problems may be obtained using the STRATOLAB platform.

Studies have indicated that future aircraft may not be able to operate in sustained level flight between the altitudes of 100,000 and 400,000 feet. Although the extreme boundary between our atmosphere and space occurs at about 600 miles, altitudes below 100,000 feet present many of the important operational and physiological space barriers. STRATOLAB provides a research platform through the zone to 100,000 feet which will continue to be useful altitudes for operational type military aircraft in the future. As a space laboratory it will provide continued opportunities for the study of various techniques and experimental equipment for manned flights into space.

SKYHOOK 60 was conducted from the USS VALLEY FORGE (CVS-45) during the period 18 - 31 January 1960 in Caribbean waters. Three balloons of 10,000,000 cubic feet each were launched from the carrier deck as well as several tracer balloons varying in size from 750,000 to 2,000,000 cubic feet. From this series of unmanned balloon launchings, the feasibility and desirability of the aircraft carrier as a launching platform for manned balloons was proved.

Because of the complexity of the system, personnel from the Office of Naval Research, Winzen Research, Inc., General Mills, Inc., Office of the Chief of Naval Operations, Bureau of Naval Weapons, Bureau of Medicine and Surgery, Naval Air Crew Equipment Laboratory, Naval Research Laboratory, Naval Medical Research Institute, Army Signal and Transportation Corps, and the Corps of Engineers Research and Development Laboratories may review certain requirements for STRATOLAB experiments.

THE STRATOLAB PHASE

The STRATOLAB program was initiated in 1954 when the gondola shell originally designed by Jean Piccard and built for Project HELIOS arrived at Minneapolis to be fitted out and tested. The first flights under Project STRATOLAB were conducted in 1955. These were low-level flights made to collect atmospheric data. The following year, intermediate altitude flights were conducted as well as the first high STRATOLAB ascent.

The STRATOLAB system consists of three categories—low, intermediate, and stratosphere flights. The open basket system is used for scientific observations in low and intermediate altitude flights. The basket is not pressurized and, therefore, the maximum altitude is limited to about 42,000 feet. The gondola used for stratospheric flights is a true "space" cabin and is adequate for flights to any altitude. Originally designed for Project HELIOS, the gondola was completed and fitted out by Winzen Research, Inc., and General Mills, Inc. It is designed to provide adequate climate,

sensing, flight control, safety, and communication equipment. The octagonal floor, 52 inches in diameter, has a total area of approximately 15 square feet. It is 9 inches above the floor of the shell. A shelf, 13 and 1/2 inches deep and 13 inches from the floor extends around the interior.

An escape hatch above the center line, or equator, of the gondola provides access to the top of the gondola. A second hatch, below the equator, provides for emergency escape. The hatches, 23 inches by 27 inches, are wide enough to permit exit by a man in a pressurized suit.

Cabin altitude pressure equivalent to 21,000 feet is maintained in the gondola during flight. An automatic servo maintains the pressure at this level by controlling the flow of oxygen. The air conditioning equipment, similar to that used in Explorer II, uses liquid gas for the air supply as well as for pressure maintenance. For protection against the cold temperatures occurring at the tropopause and lower stratosphere balloonists wear Navy cold weather clothing developed for use in the Antarctic. Standard Navy gaseous and liquid oxygen systems are used. STRATOLAB HIGH #4 utilized a closed liquid oxygen system.

The gondola is suspended from the balloon by a system of nylon webbing which are attached to the gondola. These webbings are also connected to an Air Force cargo type nylon parachute which can be used to lower the gondola in the event of an emergency. This parachute is attached to the main load line of the system. Above the parachute is a standard SKYHOOK termination equipment which will permit severing of the load from the balloon to initiate parachute descent of the gondola or to release the balloon at the moment of ground impact at landing time to prevent dragging. Immediately above the termination line is the SKYHOOK balloon.

Balloon sizes can be varied according to the upper limit of the altitude desired, the number of personnel to be accommodated, the weight of the scientific instruments, and the planned duration. The largest balloon used with this open basket system has measured about 80 feet in diameter. Since the vertical distance from the gondola to the top of the balloon is too great to use a simple "pull" valve, an electrically controlled valve is used.

A STRATOLAB flight was made on 10 August 1956 to photograph vapor trails made by jet aircraft and to obtain aeromedical data. This was the first manned stratospheric balloon flight since Explorer II of 1935, and it was the first manned flight ever made into the stratosphere using the new type plastic balloon. Observations were made of cirrus cloud particles and aeromedical measurements were taken.

During the summer of 1957, valuable observations in cloud physics were made in New Mexico during STRATOLAB open basket flights to altitudes of 26,000 and 29,000 feet in the upper troposphere. Electrical field measurements were obtained and physiological data was collected.

A STRATOLAB HIGH #1 flight, launched by General Mills, Inc., on 8 November 1956, reached an altitude of 76,000 feet. On this flight, the

21-year old record of Explorer II was broken and an era of almost routine very high altitude manned plastic balloon flights became a reality. An analogy could well be made to the long standing barrier of the four-minute mile. In both cases, once the old barrier was shattered, new records have become commonplace.

This flight demonstrated the feasibility of the system and important information was obtained. This was the first time that the sky overhead was seen as black. Cirrus cloud observations were made, photographs were taken of the sky horizon above the troposphere, the full panorama of the color variation from horizon to zenith was observed and reported, and the fliers were subjects for experiments in aviation medicine which gave valuable results. Numerous scientific experiments were conducted on a succeeding flight, STRATOLAB HIGH #2, which went to nearly 86,000 feet.

The primary purpose of a later flight on 29 July 1958 was to test and evaluate the sealed cabin system and serve as an operational and logistic rehearsal for a subsequent flight, STRATOLAB HIGH #3, on which it was planned to lift a relatively large, externally mounted telescope for use in observing the atmosphere of Mars. On this flight, the balloon stayed up for 34 hours, a new endurance record for manned balloon flights.

STRATOLAB HIGH #3 was terminated when the 2,000,000 cubic foot plastic balloon failed on the ground prior to take-off.

STRATOLAB HIGH #4 was launched from Rapid City, S. D., on 28 November 1959 and terminated at Manhattan, Kansas. The purpose of the flight was to study the planet Venus and take photographs through the use of a specially designed 16-inch telescope.

Chief pilot on the above flights was CDR Malcolm D. Ross USNR, of the Office of Naval Research. Copilot for the first three flights was the late LCDR M. Lee Lewis USN (Ret), head of the balloon flight operations for Winzen Research, Inc., developer of the gondola and plastic SKYHOOK balloon carrying the men aloft. The scientific observer for the STRATOLAB HIGH #4 was Charles B. Moore Jr., staff of Arthur D. Little, Inc., Cambridge, Mass.

DESCRIPTION OF SYSTEM

The polyethylene film for the balloons was first produced in thin gauge in 1947. Today polyethylene film and bags have become a household item, and a tremendous packaging industry has arisen as one of the results of this government sponsored research.

The rolls of plastic are dispensed onto a balloon table. One edge of the table is contoured so that when all segments of the plastic are cut to this contour and sealed together the desired balloon shape is developed. Each segment is sheared roughly to shape and then cut to final shape, heat sealed, and each seam tempered by a specially designed balloon manufacturing machine.

The balloon is encased in a plastic tube, and then carefully folded accordion fashion into a large box. This method of packaging provides protection for the balloon during shipment and storage and facilitates layout at launching time.

Lifting gas is introduced into the upper portion of the balloon by means of a separate plastic inflation tube or tubes. Other accessories serve safety, control, and launching purposes. A valve at the top is used for vertical control in flight.

The balloons constructed by General Mills, Inc., were tested in a hangar at South Weymouth, Mass. Tests were made of the structural properties of the balloon, strength of the end assemblies, and the general shape and appearance under full volume conditions corresponding to actual flight. One balloon was inflated with a properly carbureted mixture of air and helium while in the hangar to simulate the actual balloon flight. It was then inflated with pure helium until it failed, thereby determining the safety factor and weakest component. General Mills, Inc. conducted five flights using the 128 TT balloon in order to evaluate its performance and to determine the characteristics of the valve and ballast. During the test program, larger balloons of 2,000,000 cubic foot capacity developed by Winzen Research, Inc., were also used. Winzen Research, Inc. conducted three flights with the smaller balloon and five flights with the larger balloon.

MEDICAL MONITORING

The instrumented aeromedical monitoring equipment used on the STRATOLAB flights consists of telemetering equipment developed at the Naval Medical Research Institute, Bethesda, Md. Monitoring of the balloonist's heart and respiratory rates are begun several hours prior to the flight. Records of the balloonist's physiological reactions, including a continuous record of heart reactions and respiratory conditions, are transmitted to medical observers on the ground and in an accompanying aircraft.

Flat electrode pick-up discs slightly larger than a shirt button are held in place on the balloonists by black plastic electric insulating tape. Small amplifiers which are about the size of a cigarette box are used. A thermistor connected to a respiratory voltage measuring device is fastened to each microphone. The electrocardiograph amplifiers and respiratory voltage devices are fed into an FM subcarrier oscillator and to an FM transmitter. A transmitter with a range of about 100 miles is used. Without batteries, the telemetering system in the gondola weighs approximately 5 pounds.

Monitoring equipment is carried in a specially configured R5D type aircraft, an ambulance, and a carry-all. These vehicles also track and follow the course of the balloon. The equipment in the aircraft includes a Clark receiver, AN/UKR-2 telemetry set, and Brush recorder. The

composite signals are recorded on magnetic tape for future study. The signals are fed in parallel to the Brush recorder for instantaneous observation during the flight. Constant voice communication is maintained between the balloonists and the medical observers. Communications are recorded for correlative post flight study.

Continuous monitoring of the physiological condition of the balloonists permits monitors to provide early warning of possible impending danger to the safety of the flight and permits termination of the flight if necessary.

The indoctrination and training in aviation physiology of the balloonist and the accompanying scientific investigator are routinely accomplished. This includes fitting and indoctrination in the use of the pressure suit and other protective personal equipment. This equipment is checked out and oxygen indoctrination given in a refrigerated low pressure chamber. Since there is no heat in the gondola, indoctrination in the use of cold weather equipment is particularly important.

In addition, research studies on the effects of flights into the stratosphere upon man's physiological system are conducted. Direct assessments of adrenal cortical activity have been obtained as well as indirect measurements through studies of protein metabolism, electrolyte metabolism, and white blood counts. Results of these studies are published from the Naval Medical Research Institute.

Basic biological experiments preliminary to manned space flight are conducted. Fruit flies, house flies and fleas have remained at altitudes of from 78,000 to 82,000 feet for 16 hours in balloon gondolas, exposed to cosmic ray attack 60 times more intense than at sea level. These experiments have been performed in cooperation with the U. S. Department of Agriculture whose scientists examine the genetic makeup of the insects and their progeny to determine the chromosome damage resulting from cosmic ray bombardment.

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

DENTAL**SECTION**

Extension Course in Oral Surgery -
Continuing Education Program

An extension (correspondence) course, Oral Surgery, NavPers 10729, is now available to officers of the Dental Corps of the U. S. Navy and the Naval Reserve.

Developed by the staff of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md., with the assistance of professional test writers of the home study department of the University of Chicago, the course is comprised of ten assignments covering exodontia; special problems in oral surgery; oral, face, and neck infections; cysts of the oral cavity and their surgical treatment; salivary gland problems; surgical treatment of non-malignant tumors; complications associated with oral surgery; oral malignancies and congenital clefts; reduction of mandibular prognathism; fractures of the mandible, maxilla, and facial bones; radiographs; pain; oral surgery in the hospital; legal aspects of oral surgery; and suggested treatment procedures. Included in the course material is a recent edition of a widely accepted textbook on oral surgery. The textbook and course outline provide a framework of information in oral surgery which the enrollee is encouraged to supplement with study of the basic sciences and other topics pertinent to oral surgery.

This is the fourth in a series of postgraduate extension courses offered by the U. S. Naval Dental School to augment the continuing education program of the Navy Dental Corps. The courses previously prepared are Prosthodontics, Part II, NavPers 10764, (partial denture); Endodontics, NavPers 10407; and Oral Diagnosis, NavPers 10739.

These courses presented by the Department of the Navy are intended to provide Navy Dental officers with a balanced educational program. They are not intended to replace existing postgraduate or graduate courses, residency training, or the many other excellent educational experiences now enjoyed by officers of the Dental Corps. Rather, they are designed to assist Dental officers—especially those at sea and at remote or isolated stations—in providing Navy and Marine Corps personnel with the highest possible type of dental service.

Reserve Dental officers may receive promotion and retirement points which are credited upon successful completion of course units.

Units one and two of the Oral Surgery course are comprised of assignments 1 through 4, and 5 through 8, respectively, and are each evaluated at

twelve points; unit three consists of assignments 9 and 10 and is evaluated at six points.

Applications for enrollment should be submitted on NavPers 992, Application for Enrollment in Officer Correspondence Course, via official channels to the Commanding Officer (Code 5), U.S. Naval Dental School, National Naval Medical Center, Bethesda, Md.

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Resuscitators in Dental Clinics

Resuscitators for use in dental clinics have been the subject of considerable discussion and correspondence in the Defense Department as well as outside. After deliberating with specialists in anesthesiology, and considering the views of representatives from civilian and military dental professional groups, the National Research Council, National Academy of Sciences, made the following recommendations on 4 November 1959:

"1. Dentists in the service clinics should receive periodic refresher training in resuscitative measures.

2. Dental clinics should have a prearranged plan for managing respiratory emergencies.

3. The use of a mechanical positive pressure or positive-negative pressure cycling device in the management of dental respiratory emergencies is definitely not recommended.

4. The simplest pressures, such as bag, mask, and oxygen supply should be available. "

These conclusions represent the opinions of a representative group of knowledgeable people and provide appropriate advice and guidance as deemed applicable.

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Dental Treatment Prior to Transfer Overseas

A serious problem develops when personnel in need of dental treatment are transferred to remote areas overseas where the services of a dentist are not available. As quoted in part from the Manual of the Medical Department, Chapter 6-92: "Whenever practicable, personnel who are being transferred to stations where the services of a Navy Dental officer are not available should receive treatment prior to transfer. "

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Course in Complete Dentures

A Short Postgraduate Course in Complete Dentures, part of the Navy Dental Corps Continuous Training Program, will be presented at the U. S. Naval Dental School, NNMC, Bethesda, Md., 16 - 20 May 1960. CAPT R. B. Lytle DC USN, Diplomate, American Board of Prosthodontics, will be the instructor.

This course will consist of demonstrations and lectures in each phase of complete denture construction. Making accurate impressions, recording maxillomandibular relationships, occlusal corrections, and characterization of denture bases will be emphasized. The physiology of soft tissues will receive special attention.

Quotas have been assigned to the 1st, 3rd, 5th, 6th, and 9th Naval Districts, the Potomac River and Severn River Commands, and the Naval Air Reserve Training Command.

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Personnel and Professional Notes

LT Firtell Commended. LT David N. Firtell DC USNR was recently commended by the Commander, Amphibious Forces, U. S. Pacific Fleet, for his outstanding performance of duty while assigned as Dental Officer on board the USS GEORGE CLYMER. The commendation read in part:

"Your interest in the dental health of all personnel of Amphibious Squadron Three has been exceptional. You have consistently accomplished a highly commendable amount of dental treatment of excellent professional standard. The initiative you have displayed in coordinating and assisting with the dental treatment requirements of personnel of Amphibious Squadron Three has been outstanding."

New Naval Reserve Dental Company. On 1 April 1960, Naval Reserve Company 12-9 was activated at the University of California, Third and Parnassus, San Francisco, with LCDR James C. Wasley DC USNR as Commanding Officer. Membership is composed entirely of Ensigns 1925 attending the College of Physicians and Surgeons, University of California.

FDI Gavel. The gavel to be used by the speaker of the Federation Dentaire Internationale in Dublin, Ireland, in June 1960, contains sixty separate sections of wood representing the various organizations in the Federation. Fifty-four of them represent constituent societies of the American Dental Association, five represent the dental departments in government services, including the U. S. Navy Dental Corps, and one is from the central office of the American Dental Association.

Anesthesia Conference at NDS. Problems in administration of general and local anesthetics were discussed recently by a panel of dentists and physicians at a special conference at the U.S. Naval Dental School, NNMC, Bethesda, Md. Attended by staff, resident, and postgraduate Dental officers, as well as civilian guests, the conference consisted of a formal presentation by each panelist with members of the audience joining in a question and answer period. CAPT Ingram W. Ogden DC USN of the Oral Surgery Division of the Dental School moderated the panel composed of Dr. Daniel F. Lynch, Oral Surgeon, and Dr. Frank J. Grabill, Anesthesiologist, both of Washington, D. C.; and CAPT James G. Kurfees MC USN, Chief of the Anesthesiology Service, U.S. Naval Hospital, Bethesda, Md.

CAPT Wunderlich Visits Fourth Naval District. CAPT Harry J. Wunderlich DC USNR, Head, Reserve Branch, Dental Division, Bureau of Medicine and Surgery, recently visited the Fourth Naval District. While on this trip, he met with several Naval Reserve Dental Companies—4-2 Pittsburgh, Pa.; 4-3 Columbus, Ohio; 4-6 Cleveland, Ohio; and 4-1 Philadelphia, Pa.—and with Ensigns 1925 at Ohio State University, University of Pittsburgh, Temple University, and the University of Pennsylvania. The Ensign 1925 Indoctrination Course to be held at the U.S. Naval Schools Command, Naval Station, Newport, R. I., was the main topic of discussion. The new Navy film, The Navy Dental Corps, was shown to all groups.

New London County Dental Society. Dental officers from the New London Submarine Base Dental Department and the Naval Medical Research Laboratory were hosts at the annual dinner meeting of the New London County Dental Society. The dinner, attended by 50 Navy and civilian dentists, was held in the Submarine Base Officers Club. CAPT George W. Lautrup Jr. USN, Submarine Base Commanding Officer, welcomed the group. Among those present were Dr. John Wakim, President of the New London County Dental Society; CAPT Francis Waters, U.S. Public Health Service, Senior Dental Officer at the U.S. Coast Guard Academy; and CAPT Harry B. McInnis DC USN, Submarine Base Senior Dental Officer. Following the dinner, Dr. Wakim introduced the guest speaker, LT Max J. Perlitsch DC USN who spoke on dentistry in Antarctica. LT Perlitsch, attached to the Medical Research Laboratory, was stationed in Antarctica for 13 months during Operation Deepfreeze III.

Dental Health Week at Camp Lejeune. Brigadier General S.S. Wade U.S.M.C., Commanding General, Marine Corps Base, Camp Lejeune, N.C., recently proclaimed "1960 Childrens' Dental Health Week" at the Base. The Base Dental Officer, CAPT C. T. Pridgeon DC USN assisted by personnel of the base dental department, carried on a week-long program to focus attention on the importance of dental health. Utilizing a wide assortment of educational

material procured from the American Dental Association, the program was chiefly concerned with dental health education. A visit was made to each Camp School and to one county school to present demonstrations in dental health practices. In addition, the students were given an opportunity to receive a dental examination. CAPT Pridgeon stated that approximately 3,000 pupils received instruction during Dental Health Week at Camp Lejeune.

Recent Guest Lecturers at NDS. Dr. Leonard M. Monheim, Professor and Head of the Department of Anesthesiology of the School of Dentistry, and Assistant Professor, Department of Surgery (Anesthesia), of the School of Medicine, University of Pittsburgh, presented a lecture entitled "Newer Concepts of Local Anesthesia in Dental Practice." Dr. Monheim stressed that the dentist is treating patients, not merely taking care of teeth; he also showed the need for the dentist to have a thorough understanding of pharmacology, physiology, and other related sciences in order to accept this newer concept.

Dr. Irving Glickman, Professor of Oral Pathology and Periodontology and Director of Graduate and Postgraduate Studies, Tufts University School of Dental Medicine, Boston, presented a lecture, "A Master Plan for the Treatment of Periodontal Disease." In the presentation on effective periodontal treatment techniques, Dr. Glickman discussed a "master plan" which is the basis for clinical management of periodontal disease, and explained how it can be applied as part of the daily chairside practice of general dentistry.

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